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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
09/423,981	02/18/2000	SHOGO MURAMATSU	991304	7398
23850	7590	09/07/2005	EXAMINER	
ARMSTRONG, KRATZ, QUINTOS, HANSON & BROOKS, LLP 1725 K STREET, NW SUITE 1000 WASHINGTON, DC 20006			SAVAGE, JASON L	
			ART UNIT	PAPER NUMBER
			1775	

DATE MAILED: 09/07/2005

Please find below and/or attached an Office communication concerning this application or proceeding.

Office Action Summary	Application No. 09/423,981	Applicant(s) MURAMATSU ET AL	
	Examiner Jason L. Savage	Art Unit 1775	

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) OR THIRTY (30) DAYS, WHICHEVER IS LONGER, FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

- 1) ☒ Responsive to communication(s) filed on 8-22-05.
- 2a) ☐ This action is **FINAL**. 2b) ☒ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

- 4) ☒ Claim(s) 1-4 and 6 is/are pending in the application.
- 4a) Of the above claim(s) _____ is/are withdrawn from consideration.
- 5) ☐ Claim(s) _____ is/are allowed.
- 6) ☒ Claim(s) 1-4 and 6 is/are rejected.
- 7) ☐ Claim(s) _____ is/are objected to.
- 8) ☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

- 9) ☐ The specification is objected to by the Examiner.
- 10) ☐ The drawing(s) filed on _____ is/are: a) ☐ accepted or b) ☐ objected to by the Examiner.
Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).
Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).
- 11) ☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

- 12) ☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
- a) ☐ All b) ☐ Some * c) ☐ None of:
1. ☐ Certified copies of the priority documents have been received.
 2. ☐ Certified copies of the priority documents have been received in Application No. _____.
 3. ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

* See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

- | | |
|---|---|
| 1) <input type="checkbox"/> Notice of References Cited (PTO-892) | 4) <input type="checkbox"/> Interview Summary (PTO-413)
Paper No(s)/Mail Date. _____ |
| 2) <input type="checkbox"/> Notice of Draftsperson's Patent Drawing Review (PTO-948) | 5) <input type="checkbox"/> Notice of Informal Patent Application (PTO-152) |
| 3) <input checked="" type="checkbox"/> Information Disclosure Statement(s) (PTO-1449 or PTO/SB/08)
Paper No(s)/Mail Date <u>20050131</u> . | 6) <input type="checkbox"/> Other: _____ |

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Continued Examination Under 37 CFR 1.114

A request for continued examination under 37 CFR 1.114, including the fee set forth in 37 CFR 1.17(e), was filed in this application after final rejection. Since this application is eligible for continued examination under 37 CFR 1.114, and the fee set forth in 37 CFR 1.17(e) has been timely paid, the finality of the previous Office action has been withdrawn pursuant to 37 CFR 1.114. Applicant's submission filed on 8-22-05 has been entered.

Claim Rejections - 35 USC § 112

The following is a quotation of the first paragraph of 35 U.S.C. 112:

The specification shall contain a written description of the invention, and of the manner and process of making and using it, in such full, clear, concise, and exact terms as to enable any person skilled in the art to which it pertains, or with which it is most nearly connected, to make and use the same and shall set forth the best mode contemplated by the inventor of carrying out his invention.

Claims 1-4 and 6 are rejected under 35 U.S.C. 112, first paragraph, as failing to comply with the written description requirement. The claim(s) contains subject matter which was not described in the specification in such a way as to reasonably convey to one skilled in the relevant art that the inventor(s), at the time the application was filed, had possession of the claimed invention.

There is no basis for the limitation of including granular Si particles having a particle size of greater than 10 μm . While there are particles depicted in Figure 1 that have a particle size greater than that which is claimed, Applicant has not established any basis for the selection 10 μm as the lower bound for the particle size other than it is a range just outside of that disclosed by the prior art.

Claim Rejections - 35 USC § 103

The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

Claims 1-4 are rejected under 35 U.S.C. 103(a) as being unpatentable over Mori et al. (US 6,090,497) in view of Kawagoe et al. (US 5,864,745) as evidenced by the admitted Prior art.

Mori teaches a coated member wherein the coating is a wear resistant Al-Si alloy having a content of Si from 26-80 weight % and further containing fine Si particles from 0.01 to less than 10 μm dispersed therein (col. 2, ln. 27-37). The wear resistant coating may also contain additional materials such as 0.05-10% Mg, 0.5-10% Cu, 0.1-20% Sn, and between 0.05-15% of Mn, Fe, and/or Ni (col. 3, ln. 1-8; col. 3, ln. 65 - col. 4, ln. 9). Mori further teaches that the wear resistant coating which is formed by thermally spraying is suitable for compressor parts such as in automobiles (col. 5, ln. 44 - col. 6, ln. 3).

Regarding the limitation that the thickness of the coating is between 10 to 500 μm , Mori exemplifies an embodiment wherein the coating thickness is 300 μm (col. 6, ln. 19-24 and col. 7, ln. 39-44).

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Regarding the limitation that the ratio of the short-diameter to long diameter Si particles is 1/3 or more, the particles in Figure 1 of Mori appear to fit well within the claimed ratio as most of the particles appear to be more rounded in shape.

Regarding the limitation that the flame-spraying method used is HVOF, the claims are drawn to the article not the method of making. Absent a teaching of the criticality or showing of unexpected results from the use of the claimed thermal spraying method of HVOF, it does not provide a patentable distinction over the prior art. When there is a substantially similar product, as in the applied prior art, the burden of proof is shifted to the applicant to establish that their product is patentably distinct not the examiner to show that same process of making, see *In re Brown*, 173 U.S.P.Q. 685, and *In re Fessmann*, 180 U.S.P.Q. 324. Furthermore, it would have been obvious to one of ordinary skill in the art at the time the invention was made to have used any known method of thermal-spraying, including HVOF, to have applied the aluminum-alloy coating with a reasonable expectation of success. Applicant's admission on page 5, lines 28-29 of the Specification that various flame-spraying methods can be employed to form the claimed aluminum-alloy is considered evidence that the limitation of HVOF spraying is merely a design choice which does not provide a material distinction in the final product.

Regarding the limitation that the flame-spraying is performed under a half-molten state, the admitted prior art on page 3, lines 1-10 of the specification states that thermal spraying is defined as "material is converted to molten or half-molten state" (emphasis added). Flame spraying the material under a half-molten state would have been

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obvious to one of ordinary skill in the art since Mori teaches thermal spraying and the definition of flame spraying includes material converted to a half-molten state. As such, Mori is viewed to teach material converted to half-molten states.

Regarding the limitation that the alloy include silicon particles having a size greater than 10 μm , Mori teaches a similar silicon particle size of up to 10 μm (col. 2, ln. 24-32). Absent a teaching of the criticality or showing of unexpected results from the alloy having a particle size in the range claimed such as of 10.01 μm compared to a particle size in the range of the prior art such as 9.99 μm , it does not provide a patentable distinction over the prior art. The alloy proportions of the prior art and that claimed are so close that prima facie one skilled in the art would have expected them to have the same properties. Applicant has produced no evidence to rebut that prima facie case, *Titanium Metals Corporation of America V. Banner*, 227 USPQ 773.

Furthermore, the limitation of 'including granular Si particles having a particle size greater than 10 μm ' does not require a minimum threshold for the amount of Si particles which are necessary in order to meet the claim limitation. An alloy containing at least 2 particles having a size greater than 10 μm but having a median and/or average particle size substantially less than 10 μm would still meet the claim limitation. Applicant has failed to show how having a limited number of particles greater than 10 μm in size would provide a patentable distinction over the prior art.

Also, Mori teaches that by increasing the volume proportion of Si dispersed particles, wear and seizing resistance is greatly improved (col. 2, ln 43-46). Mori further exemplifies embodiments wherein particle sizes greater than 10 μm are contained in the

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alloy (col. 8, Table 2). However, Mori teaches that particle sizes greater than 10 μm are undesirable because it causes unfavorable acceleration of abrasion of a counter material (col. 4, ln. 20-22). Although Mori teaches that particle sizes greater than 10 μm may have undesirable effects, it would have been obvious to one of ordinary skill at the time of the invention to have formed large particles in the alloy, including particles larger than 10 μm with a reasonable expectation of success. One may be motivated to include larger particles in order to increase the wear and seizing resistance of the alloy if they were willing to forgo the possibility that the counter material could exhibit accelerated abrasion. All the disclosures in a reference must be evaluated for what they fairly teach one of ordinary skill in the art even though the art teachings relied upon are phrased in terms of a non-preferred embodiment or even as being unsatisfactory for the intended purpose, *In re Boe*, 148 USPQ 507 (CCPA 1966); *In re Smith*, 65 USPQ 167 (CCPA 1945); *In re Nehrenberg*, 126 USPQ 383 (CCPA 1960); *In re Watanabe*, 137 USPQ 350 (CCPA 1963).

Regarding the limitation that the alloy contain primary Si and eutectic Si particles, eutectic particles would have inherently been formed by the method of Mori but Mori does not teach that the alloy also include primary Si particles. However, Mori does teach that primary crystal particles contribute to the improvement of the wear resistance of the alloy (col. 1, ln. 23-30). It would have been obvious to one of ordinary skill in the art to have included some amount of primary particles since Mori teaches that primary particles contribute to the improvement of the wear resistance of the alloy.

Furthermore, the claim does not require any minimum or maximum amount of primary

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or eutectic particles and Applicant has failed to show how having a limited number of primary or eutectic particles would provide a patentable distinction over the prior art.

Mori does not teach the roughening of the substrate surface; however, it is well known in the art to roughen the substrate surface in order to improve the adhesion of the overlying coating. Kawagoe teaches a flame sprayed aluminum silicon alloy (col. 13, ln. 5-7) as well as shot blasting the substrate to roughen the surface before applying the wear resistant coating (col. 15, ln. 59 - col. 6, ln. 31). It would have been obvious to one of ordinary skill in the art at the time of the invention to have roughened the surface of the substrate prior to applying the wear resistant coating of Mori in order to have increased the adhesion between the substrate and the coating.

Regarding the limitation that the flame-sprayed aluminum alloy has adhesive strength of film higher than that of a flame-sprayed Ni film, such an adhesive strength would have been inherent. The Patent and Trademark Office can require Applicant to prove that prior art products do not necessarily or inherently possess characteristics of claimed products where claimed and prior art products are identical or substantially identical, or are produced by identical or substantially identical processes; burden of proof is on Applicants where rejection based on inherency under 35 U.S.C. § 102 or on prima facie obviousness under 35 U.S.C. § 103, jointly or alternatively, and Patent and Trademark Offices inability to manufacture products or to obtain and compare prior art products evidences fairness of this rejection, *In re Best, Bolton, and Shaw*, 195 U.S.P.Q. 431 (CCPA 1977).

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Regarding the material ranges in claim 3, although the weight percentages of the additional materials are not within the exact same ranges claimed by Applicant, all of the material ranges taught by Mori overlap the material ranges claimed by Applicant which obviates claim 3.

Regarding claim 4, the average granular particle sizes in the alloy of Mori would be well within the range of less than 50 μm .

Claim 6 is rejected under 35 U.S.C. 103(a) as being unpatentable over Mori et al. (US 6,090,497) in view of Kawagoe et al. (US 5,864,745) as evidenced by the admitted prior art as applied to claims 1-4, and in further view of Wilkosz et al. (US 5,655,432).

Mori and Kawagoe teach what is set forth above but it does not teach a layer covering the outer surface of the wear resistant coating. However, it is known in the art to coat wear resistant components with lubricating coatings in order to improve the seizure resistance during dry conditions.

Wilkosz teaches an aluminum-silicon swash-plate compressor which has a coating comprising a PTFE resin and lubricating particles such as carbon and MoS_2 dispersed therein (col. 3, ln. 38-60). This coating reduces the friction of the swash-plate and increases its durability (col. 3, ln. 5-8).

It would have been obvious to one of ordinary skill in the art at the time of the invention to have used the lubricating or friction reducing coatings of Wilkosz on the exterior surface of the coating taught by Mori as modified by Kawagoe in order to have

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improved the seizure resistance and to increase the durability of the swash-plate compressor, particularly during dry conditions.

Response to Arguments

Claims rejected under 35 U.S.C. 112, first paragraph

Applicant's arguments filed 1-2-03 have been fully considered but they are not persuasive.

It was noted that in a previous response to the rejection of the recited claim limitation as being drawn to new matter in the Amendment filed 1-2-03 in the last paragraph bridging pages 3 and 4, Applicant stated an average size of the particles can be obtained by analyzing Figure 1 with an image processor and measuring the size of the Si particles. Applicant further states that an apparently average-size particle was shown in the copy of Figure 1 submitted with the Amendment, which has a size of slightly greater than 10 μm .

First, it was noted in the specification on page 6, lines 35-36 that Figure 1 is described as showing the structure of the alloy according the Example 1. It was further noted on page 7, lines 14-15 that the average size of the granular Si particles in the alloy formed according to Example 1 is recited as being 3 μm . It is unclear how one measurement yielded an average particle size of greater than 10 μm such as asserted in the Amendment of 1-2-03 and another yielded an average particle size of 3 μm such as described in the specification, any clarification would be appreciated. Absent further

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clarification, the Examiner will consider the average particle size of Figure 1 to be 3 μm since that what was taught in the originally filed disclosure.

Second, assuming it is established that the average particle size in Figure 1 is greater than 10 μm , the depicted particle appears to have a size greater than 10 μm . While the particle meets the limitation of being greater than 10 μm , there is no basis for Applicant's selection of 10 μm as the lower bound for the particle size. Should Applicant intend to use the thusly calculated average particle size as a basis for the lower bound for the particle size, Applicant should use the size of the particle depicted.

As such, it is the position of the Examiner that Applicant has not demonstrated the basis for the present claim limitation, causing its rejection under 35 U.S.C. 112, first paragraph,

Claims rejected under 35 U.S.C. 103(a):

Applicant's arguments filed 8-22-05 have been fully considered but they are not persuasive.

Applicant states the fact that a comparative example of Mori teaches particles having a size greater than 10 μm is irrelevant as the composition of the comparative example is not being applied in alleging that the claimed subject matter is unpatentable thereover. Applicant further states that one of ordinary skill in the art would not utilize the particle sizes in the comparative examples in the compositions according to the supposed inventive compositions disclosed in the Mori patent, particularly in view of the statement that particle sizes of greater than 10 μm are undesirable.

This argument is moot in view of the new grounds of rejection set forth above. While the rejection above does point to the large particle sizes of the comparative examples, the rejection is based on the teaching of Mori that by increasing the volume proportion of Si dispersed particles, wear and seizing resistance is greatly improved. As such, it would have been obvious to have formed large particles in the alloy, including particles larger than 10 μm , with a reasonable expectation of success of increasing wear and seizing resistance of the alloy if one were willing to forgo the possibility that the counter material could exhibit accelerated abrasion.

The rejection above further recites that Applicant has produced no evidence to rebut the prima facie case that an alloy containing particles having a size of slightly less than 10 μm would not have the same properties as an alloy containing particles having a size of slightly greater than 10 μm .

The rejection also recites that the claim as presently recited does not set a minimum threshold for the number of particles required to have a size of greater than 10 μm . As presently claimed, an alloy containing 2 particles having the claimed size with the majority of particles having a size below 10 μm would meet the claim limitations. Should the claim be amended to recite that the average (emphasis added) particle size be greater than 10 μm , this issue would be moot although the basis for such a limitation would need to be clearly established.

Applicant also argues that the Declaration submitted under CFR 1.132 on 8-22-05, supports Applicant's previous argument that the products of the claimed invention

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differ from those of the Mori patent in terms of one or more properties and this difference produces unexpected or surprising results. Applicant points to Table 3 of the Declaration as evidence that the present invention's products have significantly improved wear and seizure load as compared with comparative products produced by different procedures and/or having different structures.

However, there are several issues with the Declaration and its showings. First, Table 1 shows various alloy compositions having varying silicon particle sizes wherein the average particle diameters are 10 μm or greater. However, the specification as originally filed states on page 7, line 15 that the average Si particle size in the alloys was 3 μm . While the specification also recites on page 4, lines 15-16 that particle sizes of over 50 μm are not desirable and particle sizes of between 1 to 40 μm may be used, there is no evidence that Applicant had possession of an alloy having a average particle size of over 10 μm at the time the invention was originally filed.

Regarding Applicant's showing in Table 3 that the particle size of 10 μm or greater increase the seizure load of the alloy, there is nothing in the specification or claims as originally filed which would lead one of ordinary skill to conclude that an increased seizure load is only achieved when particles having the claimed size are included in the alloy. While the Declaration filed 8-22-05 appears to demonstrate that the particle size, wear amount and seizure load may be interconnected, there is no evidence that Applicant was aware of such a relation between the structure and properties at the time the invention was originally filed, particularly given that the only example recited in the specification states the particle size is 3 μm .

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Finally, while it is acknowledged that the Declaration does show improved properties over the Comparative Examples listed in the Declaration, the Comparative Examples fail to compare the results of the present invention to that of the closest prior art of Mori. Mori does exemplify embodiments wherein a plasma spray method is used and very fine silicon particle sizes of less than 1 μm such as is shown in comparative example 4 of the Declaration may be used; however, it also teaches that the average silicon particle size may be between 0.01 to less than 10 μm . The Declaration does not compare the closest prior art wherein the average silicon particle size is slightly less than 10 μm as disclosed by Mori to the claimed invention wherein the alloy includes at least some particles being greater than 10 μm . As such, the evidence submitted by Applicant is not persuasive in overcoming the rejections set forth above.

Any inquiry concerning this communication or earlier communications from the examiner should be directed to Jason L. Savage whose telephone number is 571-272-1542. The examiner can normally be reached on M-F 6:30-4:00.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Deborah Jones can be reached on 571-272-1535. The fax phone number for the organization where this application or proceeding is assigned is 571-273-8300.

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Jason Savage
9-2-05


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